

# APPLYING TERM CONSISTENCY TO THE SOLUTION OF UNCONSTRAINED INTERVAL GLOBAL OPTIMIZATION PROBLEMS

## ABSTRACT

One embodiment of the present invention provides a system that solves an unconstrained interval global optimization problem specified by a function  $f$ , wherein  $f$  is a scalar function of a vector  $\mathbf{x} = (x_1, x_2, x_3, \dots, x_n)$ . The system operates by receiving a representation of the function  $f$ , and then performing an interval global optimization process to compute guaranteed bounds on a globally minimum value  $f^*$  of the function  $f(\mathbf{x})$  and the location or locations  $\mathbf{x}^*$  of the global minimum. While performing the interval global optimization process, the system deletes all of part of a subbox  $\mathbf{X}$  for which  $f(\mathbf{x}) > f\_bar$ , wherein  $f\_bar$  is the least upper bound on  $f^*$  that has been so far found. This is called the " $f\_bar$  test". The system applies term consistency to the  $f\_bar$  test over the subbox  $\mathbf{X}$  to increase that portion of the subbox  $\mathbf{X}$  that can be proved to violate the  $f\_bar$  test.